

Abstract of the Disclosure

Methods for making thin silicon layers suspended over recesses in glass wafers or substrates are disclosed. The suspended silicon wafers can be thin and flat, and can be made using methods not requiring heavy doping or wet chemical etching of the silicon. Devices suitable for production using methods according to the invention include tuning forks, combs, beams, inertial devices, and gyroscopes. One embodiment of the present invention includes providing a thin silicon wafer, and a glass wafer or substrate. Recesses are formed in one surface of the glass wafer, and electrodes are formed in the recesses. The silicon wafer is then bonded to the glass wafer over the recesses. The silicon wafer is then etched to impart the desired suspended or silicon wafer structure. In another embodiment of the present invention, the silicon wafer has a patterned metal layer. The silicon wafer is bonded to the glass wafer, with the patterned metal layer positioned adjacent the recesses in the glass wafer. The silicon wafer is selectively etched down to the metal layer, which serves as an etch stop. The metalized layer can provide sharper feature definition at the silicon-metalization layer interface, and may also serve to seal gasses within the recessed cavities of the glass wafer during the silicon etching process. The metal layer can then be subsequently removed.

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